

PERCY SLADEN MEMORIAL EXPEDITION
IN SOUTH-WEST AFRICA, 1908-9.¹

II.

IN the latitude of Loanda (8.9° S.), behind a dry, sparsely populated coastal belt about 150 miles wide, lies a mountainous zone, for the most part densely forest-covered



FIG. 1.—A glade in the Bauhinia forest showing a Baobab just before the beginning of leaf-fall

to an elevation of 4000 feet. Within this zone is the historic locality of Golungo Alto, where Welwitsch lived for two years, and in which a large part of his rich collection was obtained. Here he discovered *Gnetum africanum* in 1855.

A few miles to the south-east of Queta, a station on the railway within the forest zone and not far from its eastern edge, is situated the Government experimental plantation (Granja San Luiz), under the energetic direction of Mr. J. Gossweiler, to whom I am indebted for valuable advice and assistance during my residence there from April 1-12. The forests are here very dense and the undergrowth thick and very varied in character. After an unsuccessful search of some days' duration, *Gnetum* was eventually found on April 7 in a very dense and dark forest on the coffee and rubber estate of Montobello (2600 feet), some thirty miles to the west of Granja San Luiz and ten miles south west from the railway station of Queta. It was very abundant within a strictly limited area and its occurrence is clearly "sporadic," as described by Welwitsch. It may be noted that the native name "N-coco" given by Welwitsch is now applied indifferently to various plants of climbing habit; of *Gnetum* itself the natives seem to have no special knowledge.

Leaving Loanda on April 16, I arrived on April 21 at Mossamedes, where the third section of the journey commenced. Quite exceptional rains had recently fallen here, as in so many other districts to the south, and the gently rising plains behind the town resembled a waving cornfield rather than a desert. They supported a thick, uniform growth of a tall *Aristida* (? *A. prodigiosa*, Welw.), among which there flourished a considerable number of small annuals. In sandy places, especially in shallow,

water-channels, dense crops of the erect plumose awns of *Aristida* seeds, forced beneath the surface by their hygroscopic movements, were commonly seen. So unusual a supply of food had tempted into the vicinity of the town springbok, gemsbok and other antelopes, while ostriches had reappeared after an absence of many years. Very large *Welwitschia* plants were found in abundance about eight miles to the south of Mossamedes in the direction of Cape Negro, the locality in which it was discovered by Welwitsch. The plants had coned freely, but almost without exception the cones, severely attacked by a fungus (probably a *Cladospodium*), were in a state of decomposition—no doubt another consequence of the excessive atmospheric humidity earlier in the season. A large number of young seedlings were found. The Damaraland localities previously referred to, in which no *Welwitschia* seedlings have been found within recent years, are about forty miles from the sea. But even in these southern latitudes normal seed-reproduction seems to occur on the coast. A recent letter from Dr. Hintzinger, Acting Governor of German South-West Africa, contains the interesting statement that "wenige Kilometer nordöstlich von Cape Cross¹ die *Welwitschia* noch häufig und in fast allen Alterstadien, also auch in jungen Pflanzen vorkommt." It is not improbable that a condition of its seed-germination in nature is a degree of atmospheric humidity which is constantly realised near the sea though now usually absent from desert places inland.

On April 27 I left Mossamedes with the intention of crossing the Huilla plateau and reaching the Cunene River. I was accompanied by Mr. H. G. Mackie, H.B.M. Consul in Angola, to whose kind support the success of this part of the journey was very largely due. The light railway, at present working to the 107th kilometre, leaves Mossamedes in a northerly direction and crosses the broad beds of the periodical rivers Bero and Giroual, in which, near the sea,



FIG. 2.—Cunene marshes opposite Fort Roçadas, looking north.

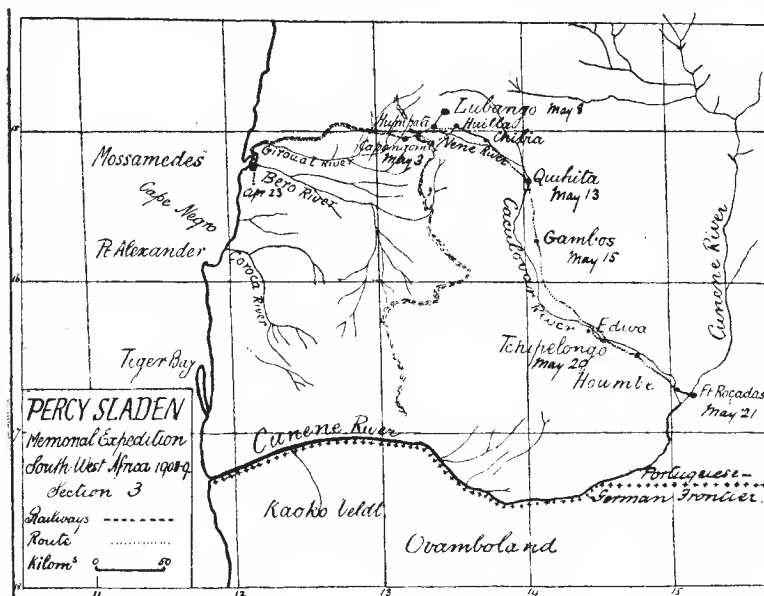
a few tropical and subtropical crops are cultivated. So far inland as the present railhead, the rainfall is small and inconstant and, in normal seasons, the country is practically waterless. At about 80 km., however, the typical desert vegetation mingles with shrubs and a few dwarf trees, which are found in greater luxuriance on the lower

¹ The first article appeared in NATURE of October 14.

¹ Lat. 21° 9' S.

slopes of the Chella Range. The railhead is situated in an open forest of stunted trees, among which *Acacias*, a *Bauhinia* and the *Baobab* are prominent, with wide, grass-covered glades. This formation extends to the lower slopes of the Chella Range becoming denser as it ascends until, near the summit, it effects a junction with a Savannah, the characteristic species of which include a number of *Proteaceæ* and other southern forms. The western face of the Chella Range rises sheer to some 3000 feet from the forest which clothes its base, above which the bedding planes of its grey, lichen-covered sandstone are plainly visible. Except for its great extent, the whole range bears a striking resemblance to Table Mountain as seen from Table Bay. Opposite Capangombe there is a gap, the entrance to a kloof up which winds a steep footpath to the top through an increasingly dense, dripping forest, with a magnificent undergrowth of maiden-hair and other ferns. Near the summit a tall *Euphorbia* with the habit of *E. grandidens* occurs in great abundance.

Leaving the Boer village of Humpata (6000 feet) on May 10, we approached the Cunene along the now well-known track down the valley of the Caculovar. On descending the eastern slopes, which are less steep than the western, we passed through the same changes of flora, in the reverse order, as those already observed.



on the other side. Passing the Huilla Mission—the scene of the botanical labours of Fathers Antunes and Dekindt—we arrived on May 13 at Chibia (4500 feet), where the proteaceous flora thins out and gives place again to the open, dry forest, in which the *Bauhinia* and *Acacias* in turn predominate. Henceforward the surface, frequently broken by tumbled heaps of gneiss and ironstone, 50 feet to 500 feet high, slopes gently down to the Cunene. From Gambos (4100 feet) the water-supply, after the end of the rainy season (April), is meagre and its quality bad, and the whole district is fever-stricken. The temperature becomes very high after mid-day, and whirlwinds of great violence spring up very suddenly, and carry columns of dust and other light objects to great heights. Three hours by waggon from Houmbe brought us to the Cunene marshes, which are here confined to the right bank of the river. Owing to the unusually late rains they were still nearly two miles wide, and it was with great difficulty that a crossing to Fort Roçadas on the opposite bank was effected. This stronghold is placed upon the high calcareous cliff forming the left bank of the river. Its neighbourhood, the scene during recent years of many engagements between the Portuguese and the trans-Cunene Ovambo tribes, has become so extremely unhealthy that it will in future be manned entirely by native troops.

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The country at its foot is thickly studded with small *Baobabs* and away to the east the open *Acacia* and *Bauhinia* forest again prevails, and undoubtedly merges farther south into the thorn-bush of Ovamboland and the *Acacia* park-formation which extends far to the south of Okahandya and Windhuk.

I take this opportunity of acknowledging the effective support which has been very kindly given to the objects of the expedition by Their Excellencies Sr. Capt. H. de Paiva Couceiro, Acting Governor-General of Angola; Herr Regierungsrath Dr. Hintrager, Acting Governor of German South-West Africa; and the Hon. W. F. Hely-Hutchinson, G.C.M.G., Governor of Cape Colony.

H. H. W. PEARSON.

MODERN METHODS OF ILLUMINATION.¹

A GREAT change has come over the methods of lighting within the last few years. We have now at our disposal means of lighting which would have seemed incredible a few years ago. Step by step with these developments has taken place the progress of education and the increase of printed matter, with the result that we use our eyes to-day far more than in the past. Our main object, therefore, should be to consider the subject of illumination from the point of view of the impression received through the eye. After emphasising this aspect of illumination, Mr. Gaster proceeds with a summary of recent developments in electric lighting.

Electric Glow-lamps.

It has long been known that a carbon filament glow-lamp could be made to yield more efficient results by bringing it to a higher temperature, i.e. running it at a pressure higher than that ordinarily utilised, but such a gain in efficiency has only been found possible at the expense of life and durability.

Within the last few years we have seen the development of lamps with filaments made of other and more refractory materials, such as the Nernst lamp, and the various metallic filaments, such as osmium, iridium, tantalum and tungsten, &c. The two last-named lamps, of course, now play a great rôle in electric lighting.

In addition, attempts have been made to improve carbon filaments in the United States by the graphitising process of Mr. Howell, by the aid of which a consumption of 2.5 watts to 3 watts per candle was attained. Another interesting attempt in this direction is the Hopfelt lamp, in which the carbon filament burns in an atmosphere of mercury vapour, with, it is stated, a consumption near 1.5 watts per candle. The Helion lamp, again, is believed to utilise a filament mainly composed of silicium; it is claimed to run for 1000 hours at 1 watt per candle, and even in the open air, without requiring to be enclosed in an evacuated globe; but it has not yet come upon the market. Perhaps the best known metallic filament lamps in use at the present day are those utilising the metal tantalum and those described by various names, but generally believed to contain as the main constituent the metal tungsten. Tungsten lamps are burned at a consumption approaching 1 watt per candle-power, and are generally stated to have a life, under good conditions, of 1000 burning hours. One great difficulty, however, has been the manufacture of lamps of moderate candle-power for high voltages, and capable of being used in any position; very recently, however, lamps having as low a candle-power as 25 or 30, and for pressures extending to 200 volts to 260

¹ Abstract of a series of four Cantor lectures delivered by Mr. Leon Gaster before the Royal Society of Arts and published in the Journal of the Society for August 6, 13, 20, 27; September 3, 10.